

Migration Rates and Flight Behavior of Migrating Eiders Near Towers at Barrow, Alaska

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During spring and fall migration, Common (*Somateria mollissima*) and King (*S. spectabilis*) eiders pass Point Barrow, Alaska, in large numbers [Thompson and Person, 1963; Timson, 1975; Day et al., 1998; Suydam et al., 1997, 2000]. Spectacled (*S. fischeri*) and Steller's (*Polysticta stelleri*) eiders also pass Point Barrow, although in small numbers. Common and King eider populations are declining dramatically, and populations of these two species are so low that they are protected under the Endangered Species Act. Because populations of all four species are in trouble, conservation of existing populations becomes increasingly important.

We studied movements and behavior of eiders migrating past the Atmospheric Radiation Measurement (ARM) tower at the CMDL Barrow Observatory (BRW) and the GEOCORONA tower at the U.S. Air Force Point Barrow Long Range Radar Site near Barrow, Alaska, under various levels of visibility in August–September 2000. The objectives of this study were to (1) determine flight tracklines of eiders migrating in the vicinity of the ARM tower (primary interest) and the GEOCORONA tower (secondary interest); (2) measure movement rates, behavior, and flight altitudes of migrating eiders in this area; (3) determine whether any of these attributes varied by visibility category, especially near these towers; and (4) assess the probability of collision of migrating eiders with these towers. Both ornithological radar and visual methods were used for sampling.

During radar sampling, 13,434 eiders were recorded in 133 identified radar echoes. Another 442 "eiderlike" radar targets that were unidentified to species, possibly representing an additional ~45,000 eiders, based on mean flock size, were recorded. During visual sampling, 19,023 eiders (6,090 of them not detected by radar) were recorded in 187 flocks (56 of them not detected by radar). Hence, data were collected on at least 19,524 eiders (not counting possibly ~45,000 eiders represented by unidentified eiderlike radar targets) over the 21 days of sampling.

Mean daily movement rates of "eiders" (i.e., unidentified eiders + unidentified ducks + unidentified waterfowl + unidentified targets that were eiderlike in flight characteristics) on radar ranged between 0 and 12.8 radar targets per hour. "Eiders" were recorded migrating on all days except one, indicating pulsed, but fairly continuous, migration during this period.

Mean movement rates of "eiders" were significantly higher during the night than during the day, during nights without precipitation, and during nights with good visibility. Frequent tailwinds at night may have increased nocturnal

movement rates; however, all of the increase could not be explained by wind direction, suggesting that movement rates actually are higher at night.

"Eiders" passed the ARM tower at a significantly greater distance from the tower during the day than at night and at a greater distance during daytime without precipitation than during all other light conditions. Visibility did not affect the distance at which they passed the tower.

"Eiders" exhibited little variation in flightlines by time of day, light condition, or session visibility. Essentially all movement was to the north of the site, around or over Brant Point, and, eventually, over Duck Camp and/or North Salt Lagoon. Only 14 (2.4%) of 590 "eider" radar targets passed south of the ARM tower, and only 9 (1.5%) passed ≤500 m from this tower, indicating that a very low percentage of all birds crossed inland near this tower.

Straight-line flight was, by far, the dominant flight behavior, occurring >99% of the time on radar and >95% of the time during visual sampling. Frequencies of straight-line flight and non-straight-line flight did not differ significantly by time of day, light condition, or session visibility. "Eider" echoes occurring ≤500 m from the tower exhibited only straight-line flight, regardless of visibility category.

During visual sampling, "eiders" exhibited substantial variation in minimal flight altitude, ranging from 0 m above ground level (agl; i.e., landing) to 70 m agl, with the overall mean flight altitude being ~12 m agl. "Eiders" observed on radar and visually exhibited no discernible response to the tower as they passed the ARM tower, regardless of visibility category and distance from this tower. The overall distance from this tower at which birds passed was large, however, in that only 5 (2.7%) of 186 flocks seen visually passed ≤500 m from the tower.

"Eider" movements discussed here were similar to those seen previously near Barrow, although the amount of nocturnal migration was not previously known to be this large. Several observed aspects of the flight behavior of "eiders" suggest that, although these birds are extremely vulnerable to collisions with human-made objects, the preferred route of movement by migrating "eiders" in this area is over the base of Barrow Spit, near Duck Camp, with few flying inland near the towers. That "eiders" flew significantly farther from the tower during the daytime than they did at night, mostly passing around Brant Point, suggests that these birds are strongly relying on visual cues to orient themselves and fly around Brant Point, rather than that they are avoiding the ARM tower.

We conclude that the probability of collision of migrating "eiders" with the existing structures at Barrow is low. However, it is recommended that (1) no new tall structures (such as towers) be built closer to the coast than these existing structures already are, and (2) any tall structures (such as towers) that are built in this area should be visible to "eiders" at a distance to give them a greater distance in which to react and avoid collisions.

REFERENCES

- Day, R.H., J.R. Rose, and B.A. Cooper, Evaluation of ornithological radar for monitoring eider migration at Point Barrow, Alaska, unpublished report prepared for U.S. Fish and Wildlife Service, Fairbanks, AK, and North Slope Borough, Barrow, AK, 42 pp., ABR, Inc., Fairbanks, AK, and Forest Grove, OR, 1998.
- Suydam, R., L. Quakenbush, M. Johnson, J.C. George, and J. Young, Migration of King and Common eiders past Point Barrow, Alaska, in spring 1987, spring 1994, and fall 1994, in *King and Common Eiders of the Western Canadian Arctic*, edited by D.L. Dickson, *Occasional Paper No. 94*, pp. 21-28, Canadian Wildlife Service, Ottawa, 1997.
- Suydam, R.S., D.L. Dickson, J.B. Fadely, and L.T. Quakenbush, Population declines of King and Common eiders of the Beaufort Sea, *Condor*, 102, 219-222, 2000.
- Thompson, D.Q., and R.A. Person, The eider pass at Point Barrow, Alaska, *J. Wildlife Manage.*, 27, 348-356, 1963.
- Timson, R.S, Late summer migration at Barrow, Alaska, unpublished report, 25 pp., U.S. Fish and Wildlife Service, Anchorage, AK, 1975.